

Progress of the Tropospheric Ozone Aircraft Measurement Program

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CMDL has begun developing a network of aircraft-based ozone measurements. Currently we use a compact and lightweight (2.1 kg) 2B Technologies, Inc., ozone monitor as a platform base. Future plans are to fully integrate the ozone monitor with the aircraft-based flask sampling system in the CMDL Carbon Cycle Greenhouse Gases (CCGG) group. The 2B instrument uses the ultraviolet (UV) absorption method to measure ozone concentrations and can record averaged data at 10-second intervals to give a new view into the vertical profiling of ozone in the lower atmosphere. By integrating Garmin global positioning system (GPS) units for height, longitude, and latitude, tropospheric ozone profiles have begun twice a month over the site at Carr, Colorado (Figure 1). Aircraft-based in situ tropospheric ozone measurements can provide a fresh look into pollution events, lower atmosphere mixing dynamics, boundary layer stability, ozone trend studies, and the validity of other samples collected in flight. The goal for year end 2004 is to have ten instrument packages developed and a minimum of five sites in North America online. The instrument package is concurrently being developed as a stand-alone system and as an integrated instrument in CCGG's sampling system to provide greater flexibility in future deployment locations.

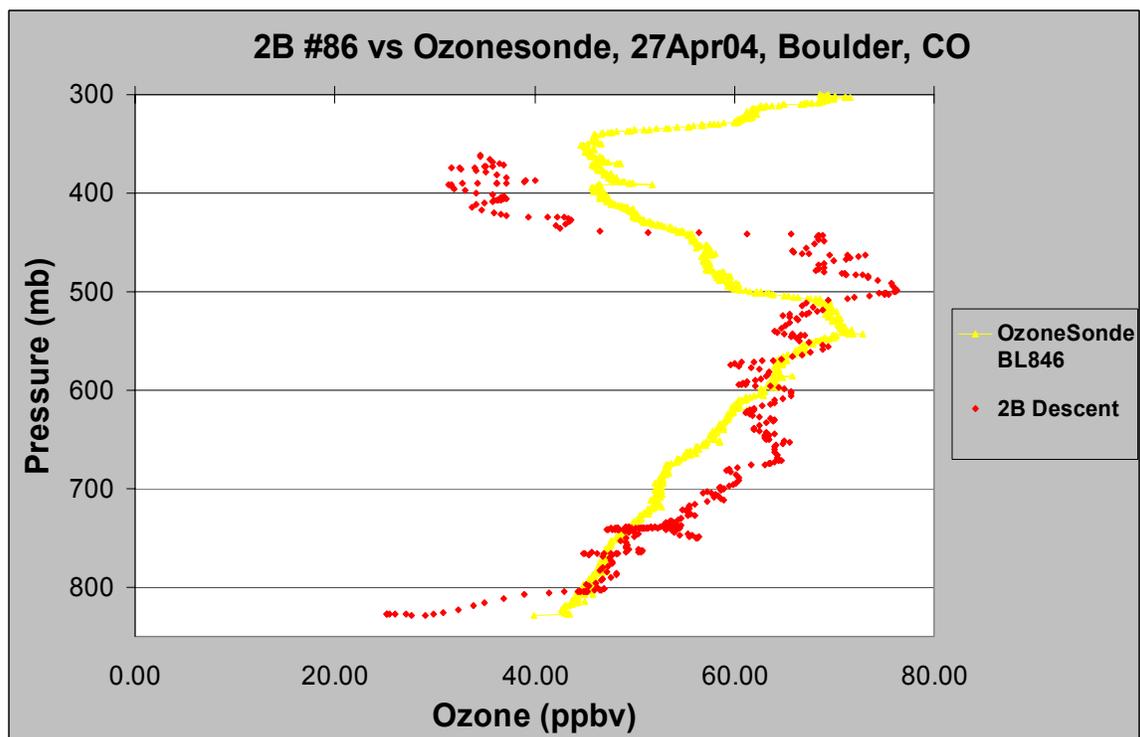


Figure 1. Preliminary plot of the 2B ozone instrument no. 86 1-minute average ozone concentration profile sampled during the aircraft's descent over the site at Carr, CO. This plot also displays the lower tropospheric portion of the ozonesonde flight, BL846, flown the same day. There is relatively good agreement between the two instrument's profiles. The flight pattern of the aircraft is to climb up to approximately 8 km (26,000 ft.) above sea level on the flight to the Carr site, then descend down in a spiral pattern directly above Carr to an altitude of 1.6 km (8,000 ft.), and return to the Boulder Municipal Airport.